Date of Issue: 07/11/2014 10:01:34

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Radiation Protection

Sample ID: 3172 600 **Date Collected:** 05/12/2014 11:15:00 AM **Lab Sample ID:** R2014001073 **Status:** Completed

Name of Sample Collector: James Hughes
Date Received:

County: NOT INDICATED **State:**
Municipality: NOT INDICATED

Location: NOT INDICATED
Reason: Project
Project: NOT INDICATED
Suite: RAD61
Matrix: Water

Stream Condition:

A sample value is an observed reading of a sample's radioactivity on a given date and time.

The Lower Level of Detection (LLD) is the minimum sample value that can be detected with 95% confidence.

The Counting Error (CE) is a factor that when added to and subtracted from a sample value, defines a range that will with 95% confidence encompass the actual sample value.

Test Codes/CAS# - Description	95% LLD	Sample Value	95% CE	Analyzed	Analyst	Test Method
AC228W ACTINIUM 228 WATER	9	97 PCI/L	10	05/22/2014 07:01 AM	TMATUKAITI	
BI212W Bismuth 212 Water	20	29 PCI/L	13	05/22/2014 07:01 AM	TMATUKAITI	
BI214W Bismuth 214 Water	5	196 PCI/L	22	05/22/2014 07:01 AM	TMATUKAITI	
GALPHA Gross Alpha Activity	234.072	853.547 PCI/L	199.535	06/15/2014 12:30 AM	JENFESLER	

Analytical Report For
Radiation Protection

Sample ID: 3172 600 **Date Collected:** 05/12/2014 11:15:00 AM **Lab Sample ID:** R2014001073 **Status:** Completed

Test Codes/CAS# - Description	95% LLD	Sample Value	95% CE	Analyzed	Analyst	Test Method
EPA 900.0						
GBETA Gross Beta Activity	209.793	251.242 PCI/L	133.11	06/15/2014 12:30 AM	JENFESLER	
EPA 900.0						
PB212W LEAD 212 WATER	7	98 PCI/L	12	05/22/2014 07:01 AM	TMATUKAITI	
GAMMA RESULTS Analyzed by method EPA 901.1						
PB214W LEAD 214 WATER	6	202 PCI/L	20	05/22/2014 07:01 AM	TMATUKAITI	
K40W POTASSIUM 40 WATER	23	104 PCI/L	19	05/22/2014 07:01 AM	TMATUKAITI	
RA226GW RADIUM 226 WATER BY GAMMA	68	363 PCI/L	61	05/22/2014 07:01 AM	TMATUKAITI	
RA228GW RADIUM 228 WATER BY GAMMA	8	93 PCI/L	10	05/22/2014 07:01 AM	TMATUKAITI	
TH232GW THORIUM 232 WATER BYGAMMA	8	93 PCI/L	10	05/22/2014 07:01 AM	TMATUKAITI	
U235GW URANIUM 235 WATER BY GAMMA	20	9 PCI/L	0	05/22/2014 07:01 AM	TMATUKAITI	
U238GW URANIUM 238 WATER BY GAMMA	118	-235 PCI/L	0	05/22/2014 07:01 AM	TMATUKAITI	

The results of the analyses provided in this laboratory report relate only to the sample(s) identified therein. Unless otherwise noted, the results presented on this laboratory report meet all requirements of the 2009 TNI standard. Sample was in acceptable condition when received by the Laboratory. Any exceptions are noted in the report.
* denotes tests that the laboratory is not accredited for
** Laboratory is accredited by NJ NELAP, parameter not offered by PA LAP

Taru Upadhyay, Technical Director, Bureau of Laboratories

Date of Issue: 07/11/2014 10:01:58

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
2575 Interstate Drive
Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Radiation Protection

Sample ID: 3172 601 **Date Collected:** 05/12/2014 11:20:00 AM **Lab Sample ID:** R2014001074 **Status:** Completed

Name of Sample Collector: James Hughes
Date Received:

County: NOT INDICATED **State:**
Municipality: NOT INDICATED

Location: NOT INDICATED
Reason: Project
Project: NOT INDICATED
Suite: RAD35
Matrix: Sludge

Stream Condition:

A sample value is an observed reading of a sample's radioactivity on a given date and time.

The Lower Level of Detection (LLD) is the minimum sample value that can be detected with 95% confidence.

The Counting Error (CE) is a factor that when added to and subtracted from a sample value, defines a range that will with 95% confidence encompass the actual sample value.

Test Codes/CAS# - Description	95% LLD	Sample Value	95% CE	Analyzed	Analyst	Test Method
AC228 Actinium 228		118000 PCI/KG	10100	06/24/2014 09:44 AM	TMATUKAITI	
BI212 Bismuth 212	681	54600 PCI/KG	5400	06/24/2014 09:44 AM	TMATUKAITI	
BI214 Bismuth 214	179	305000 PCI/KG	39800	06/24/2014 09:44 AM	TMATUKAITI	
PB212 Lead 212	353	151000 PCI/KG	10900	06/13/2014 05:11 AM	TMATUKAITI	

Analytical Report For
Radiation Protection

Sample ID: 3172 601 **Date Collected:** 05/12/2014 11:20:00 AM **Lab Sample ID:** R2014001074 **Status:** Completed

Test Codes/CAS# - Description	95% LLD	Sample Value	95% CE	Analyzed	Analyst	Test Method
GAMMA RESULTS Analyzed by method DOE 4.5.2.3						
PB214 Lead 214	279	336000 PCI/KG	23400	06/13/2014 05:11 AM	TMATUKAITI	
K40 Potassium 40	1280	17300 PCI/KG	1420	06/24/2014 09:44 AM	TMATUKAITI	
RA226G Radium 226 by Gamma	2150	434000 PCI/KG	31700	06/13/2014 05:11 AM	TMATUKAITI	
RA228G RADIUM 228 BY GAMMA	317	114000 PCI/KG	9710	06/13/2014 05:11 AM	TMATUKAITI	
TH232 Thorium 232****	317	113000 PCI/KG	9610	06/13/2014 05:11 AM	TMATUKAITI	
U235 Uranium 235	815	-909 PCI/KG	0	06/13/2014 05:11 AM	TMATUKAITI	
U238 Uranium 238	5050	-1710 PCI/KG	0	06/13/2014 05:11 AM	TMATUKAITI	

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Taru Upadhyay, Technical Director, Bureau of Laboratories

Date of Issue: 07/11/2014 10:01:45

DEP Bureau of Laboratories - Harrisburg
P.O. Box 1467
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Harrisburg, PA 17105-1467

Contact Phone Number: (717) 346-7200

NELAP - accredited by

NJ DEP - Laboratory Number: PA059
PA DEP LAP - DEP Lab ID: 22-00223

Analytical Report For
Radiation Protection

Sample ID: 3172 602 **Date Collected:** 05/12/2014 11:20:00 AM **Lab Sample ID:** R2014001075 **Status:** Completed

Name of Sample Collector: James Hughes
Date Received:

County: NOT INDICATED **State:**
Municipality: NOT INDICATED

Location: NOT INDICATED
Reason: Project
Project: NOT INDICATED
Suite: RAD35
Matrix: Sludge

Stream Condition:

A sample value is an observed reading of a sample's radioactivity on a given date and time.

The Lower Level of Detection (LLD) is the minimum sample value that can be detected with 95% confidence.

The Counting Error (CE) is a factor that when added to and subtracted from a sample value, defines a range that will with 95% confidence encompass the actual sample value.

Test Codes/CAS# - Description	95% LLD	Sample Value	95% CE	Analyzed	Analyst	Test Method
AC228 Actinium 228		128000 PCI/KG	0	06/24/2014 09:59 AM	TMATUKAITI	
BI212 Bismuth 212	1470	53200 PCI/KG	0	06/24/2014 09:59 AM	TMATUKAITI	
BI214 Bismuth 214	1020	336000 PCI/KG	0	06/24/2014 09:59 AM	TMATUKAITI	
PB212 Lead 212	232	102000 PCI/KG	8730	06/17/2014 07:56 AM	TMATUKAITI	

Analytical Report For
Radiation Protection

Sample ID: 3172 602 **Date Collected:** 05/12/2014 11:20:00 AM **Lab Sample ID:** R2014001075 **Status:** Completed

Test Codes/CAS# - Description	95% LLD	Sample Value	95% CE	Analyzed	Analyst	Test Method
GAMMA RESULTS Analyzed by method DOE 4.5.2.3						
PB214 Lead 214	334	375000 PCI/KG	30000	06/17/2014 07:56 AM	TMATUKAITI	
K40 Potassium 40	1690	20500 PCI/KG	1760	06/24/2014 09:59 AM	TMATUKAITI	
RA226G Radium 226 by Gamma	3140	514000 PCI/KG	44800	06/17/2014 07:56 AM	TMATUKAITI	
RA228G RADIUM 228 BY GAMMA	1070	121000 PCI/KG	0	06/17/2014 07:56 AM	TMATUKAITI	
TH232 Thorium 232****	1070	121000 PCI/KG	0	06/17/2014 07:56 AM	TMATUKAITI	
U235 Uranium 235	1050	895 PCI/KG	657	06/17/2014 07:56 AM	TMATUKAITI	
U238 Uranium 238	12400	-31900 PCI/KG	0	06/17/2014 07:56 AM	TMATUKAITI	

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Taru Upadhyay, Technical Director, Bureau of Laboratories